

## BACKGROUND OF THE INVENTION

5           The present invention relates to an information  
processing method for information processing by an  
information processing system including peripheral  
devices such as a printer a facsimile (fax), a copying  
apparatus, a digital composite apparatus etc., and an  
10 information processing system and a memory medium  
therefor.

Conventionally, the digital composite apparatus has developed as an extension of the conventional apparatus such as the addition of a fax function to a copying apparatus or the addition of a printer function to a facsimile. Therefore the apparatuses capable of composite operations are limited, and, even if the composite operations are possible, they can only execute composite operations or parallel operations in the unit of a job.

Also in the conventional digital composite apparatus and single-function apparatus, the processes of a series of jobs are executed in a predetermined order corresponding to the provided input/output devices or to the data format.

However, in the above-described conventional

[illegible]

5     format and a large amount of labor and time is required  
for such works.

15

In consideration of the foregoing, the object of the present invention is to provide an information processing method capable of flexibly adapting to the addition of a new function with little labor and time, and a system and a memory medium therefor.

The above-mentioned object can be attained, according to the present invention, by an image forming apparatus capable of generating a job based on procedure information received from an information processing apparatus, generating an instance of hierarchical structure based on the generated job,

5

## 10

10

15

15

20

20

20

25

25

Figs. 15A and 15B are views showing an example of job, binder and document execution processes in a job processor in a third embodiment of the present invention;

Figs. 19A, 19B, 19C, 20A, 20B and 20C are views showing examples of an output copy number/output order execution process executed by a job;

Figs. 21A, 21B, 21C, 22A, 22B and 22C are views showing examples of an output copy number/output order execution process executed by a binder;

Figs. 23A, 23B, 23C, 24A, 24B and 24C are views showing examples of an output copy number/output order execution process executed by a document;

Figs. 25A and 25B are views showing an example of job, binder and document execution processes in a job processor in a fourth embodiment of the present invention:

Figs. 26A and 26B are views showing an example of job, binder and document execution processes in a job processor in a fourth embodiment of the present invention:

Figs. 27A, 27B, 28A and 28B are views showing

examples of job, binder and document execution  
processes in the job processor;

5 Figs. 29A and 29B are views showing an example  
of an execution process in case finishing is set in a  
job;

Figs. 30A and 30B are views showing an example  
of an execution process in case finishing is set in a  
binder; and

10 Figs. 31A and 31B are views showing an example  
of an execution process in case finishing is set in a  
document.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 Now the present invention will be clarified in  
detail by embodiments thereof, with reference to the  
accompanying drawings.

<First embodiment>

20 At first there will be explained a first  
embodiment of the present invention, with reference to  
Figs. 1 to 11B. Fig. 1 is a view showing the  
configuration of an information processing system  
constituting a first embodiment of the present  
invention, wherein host computers (information  
processing apparatus) 101, 102, 103 generate various  
25 jobs and transmit the jobs to peripheral devices. A  
digital composite apparatus 104 constituting a  
peripheral device executes various jobs such as a print

job, a scan job, a fax job, a copy job etc. The first and second host computers 101, 102 and the digital composite apparatus 104 are respectively connected to a LAN (local area network) 105 whereby the first and second host computers 101, 102 can utilize the digital composite apparatus 104. The third host computer 103 is connected to the digital composite apparatus 104 through an parallel (or serial) interfaced 106 instead of the LAN, thereby being capable of utilizing the digital composite apparatus 104.

Fig. 2 is a block diagram showing the basic configuration of the information processing system shown in Fig. 1, wherein provided a CPU (central processing unit) 201 for controlling the entire system and executing various operations, a ROM (read-only memory) 202 storing a system booting program, a program for controlling a printer engine, character data, character codes etc., a RAM (random access memory) 203 constituting a memory area for various purposes such as for storing font data additionally registered by downloading or for storing and executing programs and data of various processes.

An external storage device 204 such as a hard disk is used for spooling a print job accepted by a printing apparatus (printer), for storing programs and various information files and as a work area. A display unit 205 such as a liquid crystal display is

used for displaying the set state of the printing  
apparatus, or the current process state or error state  
in the printing apparatus. An operation unit 206 is  
used for changing the setting or resetting of the  
5 printing apparatus. An engine interface a(I/F) 207 is  
used for exchanging commands for actually controlling  
the engine. A network interface (I/F) 208 is used for  
connecting devices to the network. An external  
interface (I/F) 209 is connected to the host computer  
10 through a parallel (or serial) interface. A system bus  
210 constitutes the data path among the above-described  
components.

Fig. 3 is a view showing the software structure  
inside the host computers and the digital composite  
15 apparatus 104, wherein 301 is a host computer  
(corresponding to the host computers 101 to 103 in Fig.  
1) and 302 is a controller software which is internally  
divided into a protocol analyzer (protocol analyzing  
means) 303, a job controller 304 and a device 305.

20 The protocol analyzer 303 analyzes a command  
(protocol) transmitted from the host computer 301  
through the LAN 105 shown in Fig. 1 or the external I/F  
209 shown in Fig. 2, and requests the job execution to  
the job controller 304, which actually processes the  
25 job requested by the protocol analyzer 303. The device  
305 is used at the job execution by the job controller  
304.

Fig. 4 is a block diagram outlining the controller software 302 etc. In Fig. 4, the controller software 302 includes a protocol analyzer 303, a job controller 304, a device 305. The host computer 301 is  
5 connected to the protocol analyzer 303 in the controller software 302.

The job controller 304 is provided with a job generator (job generation means) 401, a job processor (job process means) 402, a document processor (document  
10 process means, page generation means) 406, a page processor (page process means, band generation means) 407, a band processor (band process means) 408, and a device assigner (device use request arbitration means) 409. The job processor 402 is provided with a job  
15 manager (job management means) 403, a binder manager (binder management means) 404, and a document manager (document management means, document generation means) 405.

In this manner, the processors 402, 406, 407,  
20 408 are provided in hierarchical structure in which a processor of an upper hierarchical layer generates an instance for a processor of a lower hierarchical layer.

Also the device 305 is provided with plural devices such as a first device 410, a second device  
25 411, a third device 412 etc. Such device can be, for example, a scanner, a printer, a finisher or a rasterizer.



The device assigner 409 determines a device to be used from the plural devices according to the result of analysis of the protocol analyzer 303, and assigns thus determined device to the devices 406 to 408.

5           A request for a series of operations from the first host computer 101 to 103 is transmitted in the form of a command (protocol) through the network I/F 208 and the external I/F 209. The command can also be entered from the operation unit 206. The transmitted  
10       command is analyzed in the protocol analyzer 303 and is then transmitted to the job controller 304. In this operation, the command is converted into a form understandable by the job controller 304.

          The job generator 401 generates a job 413,  
15       which can be in various forms, such as a copy job, a print job, a scan job or a fax job. For example, in case of a print job, the job includes the name of the document to be printed, the number of print copies, setting information such as the designation of an  
20       output discharge tray, the print data themselves (PDL (page description language)). The job 413 is transmitted to the job processor 402 which executes setting and processing on the entire job 413.

          In the job processor 402, the job manager 403  
25       executes setting on the entire job and various processes such as the collective printing of plural binders constituting the job. The binder manager 404

executes setting on the entire binder and various processes such as the collective printing of plural documents constituting a binder. A document manager 405 executes setting on the entire document and various processes such as the collecting printing of plural pages constituting a document.

Also the job processor 402 executes, in addition to the setting and processes on the entire job 413, a division of the job into binders 414 which are smaller work units constituting the job, and, in addition to the setting and processes on the entire binder 414, a division of the binder into documents 415 which are smaller work units constituting the binder, and, in addition to the setting and processes on the entire document 415, a division of the document into input documents 416 which are smaller work units.

The input document 416 is converted by the document processor 406 into an output document 419. As an example, in case of a scan job of reading a bundle of originals by a scanner and converting it into plural image data, the input document 416 describes the setting and the operation procedure on the bundle of the originals, while the output document 419 describes the setting and the operation procedure on the plural image data. The document processor 406 performs the function of converting the sheet bundle into the plural image data.

Also the document processor 406 only executes the process in the unit of a document and generates input pages 417 which are smaller work units. This is similar to the job processor 402 in that it only  
5 executes the process in the unit of a job and generates documents for a smaller work. The setting and operation in the unit of a document relate more specifically to the order of pages such as  
10 rearrangement of pages, designation of two-side printing, addition of a cover sheet, and an OHP sheet insertion.

The input page 417 is converted by the page processor 407 into an output page 420. For example, in the aforementioned scan job, the input page 417  
15 describes the setting and procedure for the reading resolution, direction of reading (landscape/portrait) etc., and the output page 420 describes the setting and procedure for the storage position of the image data (address and data name of the RAM 203 or the external  
20 storage device 204).

In the foregoing there has been explained to gradually reduce the unit of the job so as to be processable in the unit of a page. In an expensive system capable of having a page memory of a capacity of  
25 a page, it is enough to break down the job eventually to the unit of a page. In practice, however, there can be conceived a system provided with a memory of several

lines (band memory), in consideration of the memory cost or in case of a low-speed system such as an ink jet printer. In such case, the page is handled by being divided into bands (stripe-shaped data) which are even finer units. This explains the role of an input band 418, a band processor 408 and an output band 421, and the functions thereof are similar to those in case of the page.

The job processor 402, the document processor 406, the page processor 407 and the band processor 408 respectively utilize devices in the process execution. Therefore, there naturally occurs a competition of the devices when the plural processors simultaneously execute processes, and such competition is arbitrated by the device assigner 409. First to third devices 410 to 412, being assigned to the above-mentioned processors by the device assigner 409, can be, for example, a page memory, a band memory, a document feeder, a marking engine, a scanner etc.

Fig. 5 is a view showing an example of a copy job execution process.

A request for a series of operations, from the host computer 101, 102 or 103 or the panel of the composite apparatus 104, is transmitted in the form of a command (protocol) through the operation unit 206, the network I/F 208 and the external I/F 209. The transmitted command is analyzed by the protocol

analyzer 303 and is transmitted to the job controller 304. At this point, the command is converted into a form understandable by the job controller 304.

5 The job generator 401 analyzes the transmitted command and generates a copy job 5-1, which is a composite job having the function of realizing copy. There are also generated a scan job (single job) 5-2, a print job (single job) 5-3 and an empty image document 5-8 which is an output document of the scan job 5-2 and  
10 an input document of the print job 5-3.

The image document 5-8 generates an empty image page 5-16 of an even smaller unit, constituting an output page of the scan job 5-2 and an input page of the print job 5-3. The scan job 5-2 and the print job  
15 5-3 are processed in succession by the job processor 402.

When the scan job 5-2 is transferred to the job processor 402, there are executed setting and process on the entire scan process. Other setting and process  
20 than those relating to the entire scan process are divided and processed in scan sheet documents 5-6 which are of an even smaller work unit. The scan sheet document 5-6 is converted by a document processor (sheet → image) 5-7 into an image document 5-8. The  
25 document processor 5-7 only executes the process in the unit of a document and finer processes are executed by a scan sheet page 5-14 which is an even smaller work

unit.

At first the scan sheet document 5-6 generates a sheet image 5-11 corresponding to an actual page of the original to be subjected to the image reading. The scan sheet 5-11, upon generation, registers itself (scan sheet 5-11) with an identifier in a scanner sheet manager 5-13 for controlling the order of processing of the original.

The scanner sheet manager 5-13 determines the order of processing of the scan sheet pages 5-14 according to the identifier attached to the scan sheet 5-11 or the device specifications. The scan sheet page 5-14 is converted by a page processor (sheet → image) 5-15 into an image page 5-16. The page processor 5-15 has a sequence for controlling the actual scanner device, and issues a command to a scanner controller 5-20 for controlling the scanner device while communicating with the scan sheet page 5-14 and the image page 5-16, thereby realizing the scan operation. The image page 5-16 can be stored in the RAM 203 or the external storage 204, and is correlated in the unit of processors, such as the job processor 402, the document processor 406 the page processor 407 and the band processor 408.

When the print job 503 is transferred to the job processor 4-3, the setting and process other than those relating to the entire job are divided into

5

15

20

25

processor 5-17 of the image page 5-16 which is obtained  
by conversion by the page processor (sheet → image) 5-  
15. The page processor 5-17 has a sequence for  
controlling the actual printer device, and issues a  
5 command to a printer controller 5-21 for controlling  
the printer device while communicating with the print  
sheet page 5-18 and the image page 5-16 thereby  
realizing the print operation.

10 The copy operation is thus realized by the  
above-described sequential operations in which the  
control is assigned in succession to the processors  
handling the smaller work units.

Figs. 6 and 7 are views showing an example of a  
PDL print job execution process.

15 A request for a series of operations, from the  
host computer 101, 102 or 103 or the panel of the  
composite apparatus 104, is transmitted in the form of  
a command (protocol) through the operation unit 206,  
the network I/F 208 and the external I/F 209. The  
20 transmitted command is analyzed by the protocol  
analyzer 303 and is transmitted to the job controller  
304. At this point, the command is converted into a  
form understandable by the job controller 304.

25 The job generator 401 analyzes the transmitted  
command and generates a PDL print job 6-1, which  
generates a PDL analysis job (single job) 6-2, a PDL  
development job (single job) 6-3 and a print job



(single job) 5-3, having the function of realizing the PDL print, and also generates an empty intermediate data document 6-6 which is an output document of the PDL analysis job 6-2 and an input document of the PDL development job 6-3, and an empty image document 5-8 which is an output document of the PDL development job 6-3 and an input document of the print job 5-3.

The intermediate data document 6-6 generates an empty intermediate data page 6-9 of an even smaller unit, constituting an output page of the PDL analysis job 6-2 and an input page of the PDL development job 6-3, and the image document 5-8 generates an empty image page 5-16 of an even smaller unit, constituting an output page of the PDL development job 6-3 and an input page of the print job 5-3. The PDL analysis job 6-2, the PDL development job 6-3 and the print job 5-3 are processed in succession by the job processor 402.

At first the PDL analysis job 6-2 is transferred to the job processor 402 for executing setting and process on the entire job. The setting and process other than those relating to the entire job are divided and processed in PDL documents 6-4 which are of an even smaller work unit. The PDL document 6-4 is converted by a PDL document processor (PDL → intermediate data) 6-5 into an intermediate data document 6-6. The PDL document processor 6-5 only executes the process in the unit of a document and

5

10

20

25

output document of the PDL analysis job 6-2 explained  
in the foregoing. The intermediate data page 6-9 is  
converted by an intermediate data page processor  
(intermediate data → image) 6-10 into an image page 5-  
5 16.

The intermediate data page processor 6-10 has a  
sequence for controlling the actual RIP (raster image  
processor) device, and issues a command to a RIP device  
controller 6-12 for controlling the RIP device while  
10 communicating with the intermediate data page 6-9 and  
the image page 5-16 thereby realizing the PDL  
development operation. The image page 5-16 can be  
stored in the RAM 203 or the external storage 204, and  
is correlated in the unit of the processors including  
15 the job processor 402, the document processor 406, the  
page processor 407 and the band processor 408.

In case the print job 5-3 is transferred to the  
job processor 402, there is executed a process same as  
explained in Fig. 5 to realize the print operation. In  
20 the example shown in Figs. 6 and 7, the print sheet  
document 5-10 is obtained by conversion by the document  
processor 5-9 of the image document 5-8 which is  
obtained by conversion by the intermediate data  
document processor 6-7. Also the print sheet page 5-18  
25 is obtained by conversion by the page processor 5-17 of  
the image page 5-16, which is obtained by conversion by  
the intermediate data page processor 6-10.

The PDL print operation is thus realized by the above-described sequential operations in which the control is assigned in succession to the processors handling the smaller work units.

5                Figs. 8A, 8B, 9A, 9B, 10A, 10B, 11A and 11B are views showing examples of the process for executing a job 413, a binder 414 and a document 415 in the job processor 402. These drawings illustrate the configuration of the input document 416 and the output  
10                document 419 under the control of the job manager 403.

              As explained in the foregoing, a command constituting a request for a series of operations, from the host computer 101, 102 or 103 or the panel of the composite apparatus 104, is transmitted is analyzed by  
15                the protocol analyzer 303 and is transmitted to the job controller 304.

              Fig. 8A shows a case where, as a result of the analysis by the job processor 402, a job 7-1 includes a binder 7-2-1 which includes a document 7-3-1.

20                As shown in Fig. 8B, a print job 5-3 generates a binder 5-4-1 constituting a smaller work unit and assigns thereto the setting and process other than those relating to the entire job. The binder 5-4-1 generates a document 5-5-1 constituting a smaller work  
25                unit and assigns thereto the setting and process other than those relating to the entire binder. A document processor (image → sheet) 5-9-1 converts an image

Fig. 9A shows a case where, as a result of the analysis by the job processor 402, a job 7-1 includes two binder 7-2-1, 7-2-2 which respectively include documents 7-3-1, 7-3-2.

Then the print job 5-3 generates a binder 5-4-2 and assigns the process thereto. The binder 5-4-2 generates a document 5-5-2 constituting a smaller work unit and assigns thereto the setting and process other than those relating to the entire binder. A document processor (image → sheet) 5-9-2 converts an image document 5-8-2 constituting an input document into a print sheet document 5-10-2 thereby outputting a sheet.

Fig. 10A shows a case where, as a result of the analysis by the job processor 402, a job 7-1 includes a

binder 7-2-1, which includes two documents 7-3-1, 7-3-2.

As shown in Fig. 10B, the print job 5-3 generates a binder 5-4-1 constituting a smaller work unit and assigns thereto the setting and process other than those relating to the entire job. The binder 5-4-1 generates a document 5-5-1 constituting a smaller work unit and assigns thereto the setting and process other than those relating to the entire binder. A document processor (image → sheet) 5-9-1 converts an image document 5-8-1 constituting an input document into a print sheet document 5-10-1 thereby outputting a sheet.

Then the binder 5-4-1 generates a document 5-5-2 constituting an even smaller work unit and assigns the process thereto. A document processor 5-9-2 converts an image document 5-8-2 constituting an input document into a print sheet document 5-10-2 thereby outputting a sheet.

Fig. 11A shows a case where, as a result of the analysis by the job processor 402, a job 7-1 includes two binders 7-2-1, 7-2-2 in which the binder 7-2-1 includes two documents 7-3-1, 7-3-2 while the binder 7-2-2 includes two documents 7-3-3, 7-3-4.

As shown in Fig. 11B, the print job 5-3 generates a binder 5-4-1 constituting a smaller work unit and assigns thereto the setting and process other

than those relating to the entire job. The binder 5-4-1 generates a document 5-5-1 constituting a smaller work unit and assigns thereto the setting and process other than those relating to the entire binder. A  
5 document processor (image → sheet) 5-9-1 converts an image document 5-8-1 constituting an input document into a print sheet document 5-10-1 thereby outputting a sheet.

Then the binder 5-4-1 generates a document 5-5-2 constituting an even smaller work unit and assigns the process thereto. A document processor 5-9-2 converts an image document 5-8-2 constituting an input document into a print sheet document 5-10-2 thereby outputting a sheet.  
10

Then the print job 5-3 generates a binder 5-4-2 and assigns the process thereto. The binder 5-4-2 generates a document 5-5-3 constituting an even smaller work unit and assigns thereto the setting and process other than those relating to the entire binder. A  
15 document processor (image → sheet) 5-9-3 converts an image document 5-8-3 constituting an input document into a print sheet document 5-10-3 thereby outputting a sheet.  
20

Then the binder 5-4-2 generates a document 5-5-4 constituting an even smaller work unit and assigns the process thereto. A document processor (image → sheet) 5-9-4 converts an image document 5-8-4  
25

2025 RELEASE UNDER E.O. 14176

The above-described procedure enables operations corresponding to various combinations of the binder 414 and the document 415 constituting the job 413, thereby enabling the output in various forms.

**<Second embodiment>**



In the following there will be explained a second embodiment of the present invention with reference to Figs. 12 to 14. In the present embodiment, the information processing system is same  
5 in the basic configuration and processes as that in the foregoing first embodiment shown in Figs. 1 to 7, and will therefore be explained with reference to these drawings wherever necessary.

Figs. 12 and 13 are views showing an example of  
10 the execution process of a book binding mode in a copy job process.

A command which is a request for a series of operations, transmitted from the host computer 101, 102 or 103 or the panel of the composite apparatus 104 as  
15 in the first embodiment, is analyzed by the protocol analyzer 303 and is transmitted to the job controller 304. At this point, the command is converted into a form understandable by the job controller 304.

The job generator 401 analyzes the transmitted  
20 command and generates a composite copy job 5-1, which generates a scan job (single job) 5-2 and a print job (single job) 5-3, having the function of realizing the copy. The copy job 5-1, upon detecting a book binding mode for output with book binding, generates an image  
25 layout job 5-31 for executing the book binding output. The scan job 5-2, the image layout job 5-31 and the print job 5-3 are processed in succession by the job

processor 402.

At first the scan job 5-2 is transferred to the job processor 402 for executing setting and process on the entire scan job. The scan job 502 generates a scan sheet document 5-6 constituting an input document and a document processor (sheet → image) 5-7. For the output document, there is used an image document 508 generated by the image layout job 5-3-1.

The setting and process other than those relating to the entire scan process are divided and processed in scan sheet documents 5-6 which are of an even smaller work unit. The scan sheet document 5-6 is converted by a document processor 5-7 into an image document 5-8. The document processor 5-7 only executes the process in the unit of a document and finer processes are executed in scan sheet pages 5-14 which are of an even smaller work unit.

The process among the scan sheet document 5-6, the scan sheet 5-11, the scanner sheet manager 5-13, the scan sheet page 5-14, the page processor (sheet → image) 5-16, the image page 5-16 and the scanner controller 5-20 is same as in the first embodiment (Fig. 5).

The image layout job 5-31 is transferred to the job processor 402 for setting and process relating to the entire image layout, and generates an image document 508 constituting an input document, a document

processor (image → image) 5-32 and an image document 5-33 constituting an output document.

5 The setting and process other than those relating to the entire image layout job are divided and processed in image documents 5-8 constituting even smaller work units. In these operations, the image document 5-8 is converted by the document processor 5-32 into the image document 5-33. The document processor 5-32 only executes the process in the unit of  
10 a document, and finer processes are executed in an image page 5-16 constituting an even smaller work unit.

The image page 5-16 is converted by a page processor processor (image → image) 5-35 into an image page 5-35. The page processor 5-34 has a sequence for  
15 controlling the image process device, and issues a command to an image process device controller 5-36 for controlling the image process device while communicating with the image page 5-16 and the image page 5-35 thereby realizing the image process. The  
20 image page 5-35 can be stored in the RAM 203 or the external storage 204.

When the print job 5-3 is transferred to the job processor 402, there are executed setting and process relating to the entire job. The print job 402  
25 employs, as the input document, the image document 5-33 generated by the image layout job 5-31, and, generates a document processor 5-9 and a print sheet document 5-10

constituting an output document.

5       The setting and process other than those  
relating to the entire print job are divided into  
binders 5-4 constituting even smaller work units, and  
the setting and process other than those relating to  
10   the entire binder are divided into documents 5-5  
constituting even smaller work units to execute the  
setting and process for the entire print process. Also  
the setting and process other than those relating to  
10   the entire print process are divided and executed in  
print sheet documents 5-10 constituting even smaller  
work units. The print sheet document 5-10 is obtained  
by conversion by the document processor (image → sheet)  
5-9 of the image document 5-33 which is obtained by  
15   conversion by the document processor 5-32.

20       The process among the document processor 5-9,  
the print sheet document 5-10, the print sheet 5-12,  
the page processor 5-18, the print sheet page 5-18, the  
printer sheet manager 5-19 and the printer controller  
20   5-21 is same as in the first embodiment (Fig. 5).  
However, the print sheet page 5-18 is obtained by  
conversion by the page processor 5-17 of the image page  
5-35 which is obtained by conversion by the page  
processor 5-34.

25       The copying operation with book binding is thus  
realized by the above-described sequential operations  
in which the control is assigned in succession to the

processors handling the smaller work units.

Also in case of PDL, there can be obtained similar effects by causing the PDL print job to generate, upon detecting the book binding output mode, the image layout job 5-31 instead of the image document.

Fig. 14 is a view showing an example of input/output mode in the book binding output mode.

In an image document 5-8, there are contained images which are scanned by the scanner and accumulated in the RAM 203 or the external storage 204 under the control of the document processor 5-7, in the form of image pages 5-16 in the order of scan (1 to 8). The document processor 5-32 identifies the image pages 5-35 to be obtained by conversion, based on the instruction of the book binding output and various settings (book to be opened from the left or from the right, size of each page in the image document, output sheet size etc.). In the illustrated example, it is identified to form a page of the image document 5-33 in a 2-in-1 format, and the conversion from the image documents 5-8 to the image documents 5-33 is executed in the order of 81, 82, ..., 88. Thus the book binding output can be realized by two-side printing of thus converted pages by the document processor 5-9.

The present embodiment not only provides the effects same as those of the first embodiment but also

enables to flexibly adapt to the book binding output mode with little labor and time.

<Third embodiment>

In the following there will be explained a  
5 third embodiment of the present invention with  
reference to Figs. 15A to 24B. In the present  
embodiment, the information processing system is same  
in the basic configuration and processes as that in the  
foregoing first embodiment shown in Figs. 1 to 7, and  
10 will therefore be explained with reference to these  
drawings wherever necessary.

Figs. 15A, 15B, 16A, 16B, 17A, 17B, 18A and 18B  
are views showing examples of the execution process of  
a job 413, a binder 414 and a document 415 in the job  
processor 402. These drawings show the configuration  
15 of the input document 416 and the output document 419  
under the control of the job manager 403.

A command which is a request for a series of  
operations, transmitted from the host computer 101, 102  
20 or 103 or the panel of the composite apparatus 104 as  
in the first embodiment, is analyzed by the protocol  
analyzer 303 and is transmitted to the job controller  
304. At this point, the command is converted into a  
form understandable by the job controller 304.

25 Fig. 15A shows a case where, as a result of  
analysis by the job processor 402, a job 7-1 includes a  
binder 7-2-1, which in turn includes a document 7-3-1.



the output copy number N and the output order relating to the entire job, also generates a binder 5-4-1 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-1 processes the  
5 output copy number N and the output order relating to the entire binder, also generates a document 5-5-1 constituting an even smaller work unit and assigns other processes thereto. The document 5-5-1 processes the output copy number N and the output order relating  
10 to the entire document, also generates a document processor (image → sheet) 5-9-1 and assigns other processes thereto. The document processor 5-9-1 converts an image document 5-8-1 constituting an input document into a print sheet document 5-10-1, thereby  
15 outputting a sheet.

Then the print job 5-3 generates a binder 5-4-2 and assigns the processes thereto. The binder 5-4-2 processes the output copy number N and the output order relating to the entire binder, also generates a  
20 document 5-5-2 constituting an even smaller work unit and assigns the processes thereto. The document 5-5-2 processes the output copy number N and the output order relating to the entire document, and assigns other processes to a document processor (image → sheet) 5-9-2  
25 constituting an even smaller work unit. The document processor 5-9-2 converts an image document 5-8-2 constituting an input document into a print sheet



document 5-10-2, thereby outputting a sheet.

Fig. 17A shows a case where, as a result of analysis by the job processor 402, a job 7-1 includes a binder 7-2-1, which includes two documents 7-3-1, 7-3-2. In each  
5 of the job 7-1, the binder 7-2-1 and the documents 7-3-1, 7-3-2, there can be set a number N of output copies and the order of output (collating on/off).

As shown in Fig. 17B, a print job 5-3 processes the output copy number N and the output order relating  
10 to the entire job, also generates a binder 5-4-1 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-1 processes the output copy number N and the output order relating to the entire binder, also generates a document 5-5-1  
15 constituting an even smaller work unit and assigns other processes thereto. The document 5-5-1 processes the output copy number N and the output order relating to the entire document, and assigns other processes to a document processor (image → sheet) 5-9-1 constituting  
20 an even smaller work unit. The document processor 5-9-1 converts an image document 5-8-1 constituting an input document into a print sheet document 5-10-1, thereby outputting a sheet.

Then the binder 5-4-1 generates a document 5-5-2  
25 2 constituting an even smaller work unit and assigns the processes thereto. The document 5-5-2 processes the output copy number N and the output order relating

to the entire document, and assigns other processes to  
a document processor (image → sheet) 5-9-2 constituting  
an even smaller work unit. The document processor 5-9-  
2 converts an image document 5-8-2 constituting an  
5 input document into a print sheet document 5-10-2,  
thereby outputting a sheet.

Fig. 18A shows a case where, as a result of  
analysis by the job processor 402, a job 7-1 includes  
two binders 7-2-1, 7-2-2 in which the binder 7-2-1  
10 includes two documents 7-3-1, 7-3-2, and the binder 7-  
2-2 includes two documents 7-3-3, 7-3-4. In each of  
the job 7-1, the binders 7-2-1, 7-2-2 and the documents  
7-3-1, 7-3-2, 7-3-3, 7-3-4, there can be set a number N  
of output copies and the order of output (collating  
15 on/off).

As shown in Fig. 18B, a print job 5-3 processes  
the output copy number N and the output order relating  
to the entire job, also generates a binder 5-4-1  
constituting a smaller work unit and assigns other  
20 processes thereto. The binder 5-4-1 processes the  
output copy number N and the output order relating to  
the entire binder, also generates a document 5-5-1  
constituting an even smaller work unit and assigns  
other processes thereto. The document 5-5-1 processes  
25 the output copy number N and the output order relating  
to the entire document, and assigns other processes to  
a document processor (image → sheet) 5-9-1 constituting

an even smaller work unit. The document processor 5-9-1 converts an image document 5-8-1 constituting an input document into a print sheet document 5-10-1, thereby outputting a sheet.

5               Then the binder 5-4-1 generates a document 5-5-2 constituting an even smaller work unit and assigns the processes thereto. The document 5-5-2 processes the output copy number N and the output order relating to the entire document, and assigns other processes to  
10           a document processor (image → sheet) 5-9-2 constituting an even smaller work unit. The document processor 5-9-2 converts an image document 5-8-2 constituting an input document into a print sheet document 5-10-2, thereby outputting a sheet.

15           Then the print job 5-3 generates a binder 5-4-2 and assigns the processes thereto. The binder 5-4-2 processes the output copy number N and the output order relating to the entire binder, also generates a document 5-5-3 constituting an even smaller work unit  
20           and assigns other processes thereto. The document 5-5-3 processes the output copy number N and the output order relating to the entire document, and assigns other processes to a document processor (image → sheet) 5-9-3 constituting an even smaller work unit. The  
25           document processor 5-9-3 converts an image document 5-8-3 constituting an input document into a print sheet document 5-10-3, thereby outputting a sheet.

Then the binder 5-4-2 generates a document 5-5-4 constituting an even smaller work unit and assigns the processes thereto. The document 5-5-4 processes the output copy number N and the output order relating to the entire document, and assigns other processes to a document processor (image → sheet) 5-9-4 constituting an even smaller work unit. The document processor 5-9-4 converts an image document 5-8-4 constituting an input document into a print sheet document 5-10-4, thereby outputting a sheet.

The above-described procedure enables operations corresponding to various combinations of the binder 414 and the document 415 constituting the job 413, thereby enabling the output in various forms.

Figs. 19A to 19C and 20A to 20C are views showing examples of an output copy number/output order execution process executed by the job.

Fig. 19A shows a case where the job includes two binders and there are set, for the job, conditions of output copy number = 2 and collation = off.

At first, as shown in Fig. 19B, the print job generates a first binder 1-1 (8-1), and instructs the generated binder 1-1 to start the process (8-2). When the process comes close to the end, the binder 1-1 informs the print job of the end of process in advance (8-3). In response, the print job generates a binder 1-2 which is a copy of the first binder 1-1, since the

5

10

25

order of the binder 1-1, the binder 1-2, the binder 2-1 and the binder 2-2 as shown in Fig. 19C.

Fig. 20A shows a case where the job includes two binders and there are set, for the job, conditions of output copy number = 2 and collation = on.

At first, as shown in Fig. 20B, the print job generates a first binder 1-1 (9-1), and instructs the generated binder 1-1 to start the process (9-2). When the process comes close to the end, the binder 1-1 informs the print job of the end of process in advance (9-3). In response, the print job transfers the process to the second binder, since the collation = on is selected in this case. More specifically, there is generated a second binder 2-1 (9-4), and the generated binder 2-1 is given an instruction to start the process (9-5). When the process comes close to the end, the binder 2-1 informs the print job of the end of process in advance (9-6). As the process is thus completed for the first copy of all the binders in the job, there is executed the process for the set output copy number.

At first, there is generated a binder 1-2 which is a copy of the first binder 1-1 (9-7), and the generated binder 1-2 is given an instruction to start the process (9-8). When the process comes close to the end, the binder 1-2 informs the print job of the end of process in advance (9-9). Having received the information for the end of process from the binder 1-2,

the print job transfers the process to the second binder since the collation = on is selected in this case. More specifically, there is generated a binder 2-2 which is a copy of the second binder 2-1 (9-10),  
5 and the generated binder 2-2 is given an instruction to start the process (9-11). When the process comes close to the end, the binder 2-2 informs the print job of the end of process in advance (9-12). Since the process is thus completed for the output copy number set for all  
10 the binders, the process proceeds to a succeeding stage.

The contents set in the job are executed in succession by the repetition of the above-described process. The obtained results are outputted in the  
15 order of the binder 1-1, the binder 1-2, the binder 2-1 and the binder 2-2 as shown in Fig. 20C.

Figs. 21A to 21C and 22A to 22C are views showing examples of an output copy number/output order execution process executed by the binder.

20 Fig. 21A shows a case where the job includes a binder which includes two documents, and there are set, for the job, conditions of output copy number = 2 and collation = off.

At first, as shown in Fig. 21B, the print job  
25 generates a binder (10-1), and instructs the generated binder to start the process (10-2). The binder generates a first document 1-1 (10-3) and instructs the

generated document 1-1 to start the process (10-4).  
When the process comes close to the end, the document  
1-1 informs the binder of the end of process in advance  
(10-5). In response, the binder generates a document  
5 1-2 which is a copy of the first document 1-1, since  
the collation = off is selected in this case (10-6).  
Then the generated document 1-2 is given an instruction  
to start the process (10-7). When the process comes  
close to the end, the document 1-2 informs the binder  
10 of the end of process in advance (10-8). As the  
process is thus completed for the output copy number (= 2)  
set for the first document, the process is  
transferred to the second document.

Then, having received the information for the  
15 end of process from the document 1-2, the binder  
generates a second document 2-1 (10-9), and instructs  
the generated document 2-1 to start the process (10-10).  
When the process comes close to the end, the  
document 2-1 informs the binder of the end of process  
20 in advance (10-11). In response, the binder generates  
a document 2-2 which is a copy of the second document  
2-1, since the collation = off is selected in this case  
(10-12). Then the generated document 2-2 is given an  
instruction to start the process (10-13). When the  
25 process comes close to the end, the document 2-2  
informs the binder of the end of process in advance  
(10-14). As the process is thus completed for the



The contents set in the binder are executed in succession by the repetition of the above-described process. The obtained results are outputted in the order of the document 1-1, the document 1-2, the document 2-1 and the document 2-2 as shown in Fig. 21C.

At first, the print job generates a binder (11-1), and instructs the generated binder to start the process (11-2). The binder generates a first document 1-1 (11-3) and instructs the generated document 1-1 to start the process (11-4). When the process comes close to the end, the document 1-1 informs the binder of the end of process in advance (11-5). In response, the binder transfers the process to the second document, since the collation = on is selected in this case.

More specifically, there is generated a second document 2-1 (11-6), and the generated document 2-1 is given an instruction to start the process (11-7). When the process comes close to the end, the document 2-1 informs the binder of the end of process in advance (11-8). As the process is thus completed for the first copy for all the documents contained in the binder,

there is executed the process for the set output copy number.

More specifically, there is generated a document 1-2 which is a copy of the first document 1-1 (11-9), and the generated document 1-2 is given an instruction to start the process (11-10). When the process comes close to the end, the document 1-2 informs the binder of the end of process in advance (11-11). Having received the information for the end of process from the document 1-2, the binder transfers the process to the second document, since the collation = on is selected in this case. More specifically, there is generated a document 2-2 which is a copy of the second document 2-1 (11-12), and the generated document 2-2 is given an instruction to start the process (11-13). When the process comes close to the end, the document 2-2 informs the binder of the end of process in advance (11-14). As the process is thus completed for the output copy number set for all the documents, the process proceeds to a succeeding stage.

The contents set in the job are executed in succession by the repetition of the above-described process. The obtained results are outputted in the order of the document 1-1, the document 1-2, the document 2-1 and the document 2-2 as shown in Fig. 20C.

Figs. 23A to 23C and 24A to 24C are views showing examples of an output copy number/output order

Fig. 23A shows a case where the job includes a binder which includes a document, and there are set, for the document, conditions of output copy number = 2 and collation = off.

Then, having received the information for the

Then, having received the information for the

5

20

25

At first, as shown in Fig. 24B, the print job

generates a binder (13-1), and instructs the generated binder to start the process (13-2). The binder generates a document (13-3) and instructs the generated document to start the process (13-4). The document  
5 generates a first document processor 1-1 (13-5) and instructs the generated document processor 1-1 to start the process (13-6). When the process comes close to the end, the document processor 1-1 informs the document of the end of process in advance (13-7). In  
10 response, the document transfers the process to the second document processor, since the collation = on is selected in this case. More specifically, there is generated a second document processor 2-1 (13-8), and the generated document processor 2-1 is given an  
15 instruction to start the process (13-9). When the process comes close to the end, the document processor 2-1 informs the document of the end of process in advance (13-10). As the process is thus completed for the first copy of all the document processors, there is  
20 then executed the process for the set output copy number.

More specifically, there is generated a document processor 1-2 which is a copy of the first document processor 1-1 (13-11), and the generated  
25 document processor 1-2 is given an instruction to start the process (13-12). When the process comes close to the end, the document processor 1-2 informs the

document of the end of process in advance (13-13).

Having received the information for the end of process from the document processor 1-2, the document transfers the process to the second document processor, since the collation = on is selected in this case. .More specifically, there is generated a document processor 2-2 which is a copy of the second document processor 2-1 (13-14), and the generated document processor 2-2 is given an instruction to start the process (13-15).

When the process comes close to the end, the document processor 2-2 informs the document of the end of process in advance (13-16). Since the process is thus completed for the output copy number set for all the documents, the process proceeds to a succeeding stage.

The contents set in the document are executed in succession by the repetition of the above-described process. The obtained results are outputted in the order of a page 1, a page 1, a page 2 and a page 2 as shown in Fig. 24C.

The present embodiment not only provides effects similar to those of the first embodiment but also enables, through various combinations of the setting and process, finer setting on the order of output in outputting plural document in a job.

<Fourth embodiment>

In the following there will be explained a

fourth embodiment of the present invention with  
reference to Figs. 25A to 31B. In the present  
embodiment, the information processing system is same  
in the basic configuration and processes as that in the  
5 foregoing first embodiment shown in Figs. 1 to 7, and  
will therefore be explained with reference to these  
drawings wherever necessary.

Figs. 25A, 25B, 26A, 26B, 27A, 27B, 28A and 28B  
are views showing examples of the execution process of  
10 a job 413, a binder 414 and a document 415 in the job  
processor 402. These drawings show the configuration  
of the input document 416 and the output document 419  
under the control of the job manager 403.

A command which is a request for a series of  
15 operations, transmitted from the host computer 101, 102  
or 103 or the panel of the composite apparatus 104 as  
in the first embodiment, is analyzed by the protocol  
analyzer 303 and is transmitted to the job controller  
304. At this point, the command is converted into a  
20 form understandable by the job controller 304.

Fig. 25A shows a case where, as a result of  
analysis by the job processor 402, a job includes a  
binder, which in turn includes a document. In each of  
the job, the binder and the document, there can be set  
25 finishing (stapled sorting, shift sorting, rotated  
sorting etc.).

The process flow shown in Fig. 25B is similar

to that in the first embodiment (Fig. 8B). However,  
the designation of finishing is processed in the  
following manner. In case a finishing is designated  
for the job, the print job 5-3 invalidates the  
5 designation of finishing in the binder 5-4-1 or the  
document 5-5-1 ranked below the print job. Also in  
case a finishing is designated for the binder, the  
binder 5-4-1 invalidates the designation of finishing  
in the document 5-5-1 ranked below the binder.

10 Fig. 26A shows a case where, as a result of  
analysis by the job processor 402, a job includes two  
binders each of which includes a document. In each of  
the job, the binders and the documents, there can be  
designated a finishing.

15 The process flow shown in Fig. 26B is similar  
to that in the first embodiment (Fig. 9B). However,  
the designation of finishing is rendered effective only  
in the highest level as in the case of Figs. 25A and  
25B. More specifically, in case a finishing is  
20 designated for the job, the print job 5-3 invalidates  
the designation of finishing in the binders 5-4-1, 5-4-  
2 or the documents 5-5-1, 5-5-2 ranked below the print  
job. Also in case a finishing is designated for the  
binder, the binders 5-4-1, 5-4-2 invalidate the  
25 designation of finishing in the documents 5-5-1, 5-5-2  
ranked below the binder.

Fig. 27A shows a case where, as a result of



analysis by the job processor 402, a job includes a binder which includes two documents. In each of the job, the binder and the documents, there can be designated a finishing.

5           The process flow shown in Fig. 27B is similar to that in the first embodiment (Fig. 10B). However, the designation of finishing is made effective only in the highest level as in the case of Figs. 25A and 25B. More specifically, in case a finishing is designated  
10   for the job, the print job 5-3 invalidates the designation of finishing in the binder 5-4-1 or the documents 5-5-1, 5-5-2 ranked below the print job. Also in case a finishing is designated for the binder, the binder 5-4-1 invalidates the designation of  
15   finishing in the documents 5-5-1, 5-5-2 ranked below the binder.

Fig. 28A shows a case where, as a result of analysis by the job processor 402, a job includes two binders each of which includes two documents. In each  
20   of the job, the binders and the documents, there can be designated a finishing.

The process flow shown in Fig. 28B is similar to that in the first embodiment (Fig. 11B). However, the designation of finishing is made effective only in  
25   the highest level as in the case of Figs. 25A and 25B. More specifically, in case a finishing is designated for the job, the print job 5-3 invalidates the

designation of finishing in the binders 5-4-1, 5-4-2 or  
the documents 5-5-1, 5-5-2, 5-5-3, 5-5-4 ranked below  
the print job. Also in case a finishing is designated  
for the binder, the binder 5-4-1 invalidates the  
5 designation of finishing in the documents 5-5-1, 5-5-2  
ranked below the binder, and the binder 5-4-2  
invalidates the designation of finishing in the  
documents 5-5-3, 5-5-4 ranked below the binder.

The above-described procedures enable  
10 operations corresponding various combinations of the  
binder 414 and the document 415 constituting the job  
413, thereby enabling output in various forms.

Figs. 29A, 29B, 30A, 30B, 31A and 31B are views  
showing examples of the execution process when the  
15 finishing is designated. Figs. 29A, 30A and 31A show a  
case where a job includes two binders each of which  
includes two documents. These drawings show the  
configuration of the input document 416 and the output  
document 419 under the control of the job manager 403.

20 Figs. 29A and 29B show an example of the  
execution process in case a finishing is set in the  
job.

As shown in Fig. 29B, the print job 5-3, upon  
detecting the setting of a finishing on the job,  
25 generates a print sheet document 5-10 constituting an  
output document. It also generates a binder 5-4-1  
constituting a smaller work unit and assigns thereto



on the job, it so functions as to invalidate the designation of finishing on the document. The binder 5-4-1, being informed of the output document from the print job 5-3, informs the document 5-5-2 of the print sheet document 5-10 constituting the output document.

The document 5-5-2 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-2 constituting an even smaller work unit. It also informs that the output address is the print sheet document 5-10. The document processor 5-9-2 converts an image document 5-8-2 constituting an input document into the print sheet document 5-10 thereby outputting a sheet.

Then the print job 5-3 generates a binder 5-4-2 and assigns the processes thereto. In this operation, since the finishing is designated on the job, the print job so functions as to invalidate the finishing designation on the binder and the document. Also the print job informs the binder 5-4-2 of the already generated print sheet document 5-10 constituting the output document.

The binder 5-4-2 processes the setting on itself, then generates a document 5-5-3 constituting an even smaller work unit and assigns thereto other processes. In this operation, since the finishing is designated on the job, the binder so works as to invalidate the finishing designation on the document.

5           The document 5-5-3 processes the setting on  
itself, and assigns other processes to a document  
processor (image → sheet) 5-9-3 constituting an even  
smaller work unit. It also informs that the output  
address is the print sheet document 5-10. The document  
10 processor 5-9-3 converts an image document 5-8-3  
constituting an input document into the print sheet  
document 5-10 thereby outputting a sheet.

The document 5-5-4 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-4 constituting an even smaller work unit. It also informs that the output address is the print sheet document 5-10. A document processor 5-9-4 converts an image document 5-8-4 constituting an input document into the print sheet

document 5-10 thereby outputting a sheet.

It is thus rendered possible to realize an operation of finishing the entire job by correlating the documents

5 included in the job to an output document and finishing such output document.

Figs. 30A and 30B show an example of the execution process in case a finishing is set on the binder.

10 As shown in Fig. 30B, the print job 5-3 processes the setting on itself, then generates a binder 5-4-1 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-1, upon detecting the setting of a finishing on itself  
15 (binder), generates a print sheet document 5-10-1 constituting an output document. It also processes the setting on itself and generates a document 5-5-1 constituting an even smaller work unit and assigns thereto other processes. In this operation, since the  
20 finishing is designated on the binder, the binder so functions as to invalidate the designation of finishing on the document. Also the binder informs the document 5-5-1 of the generated print sheet document 5-10.

The document 5-5-1 processes the setting on  
25 itself, and assigns other processes to a document processor (image → sheet) 5-9-1 constituting an even smaller work unit. In this operation, the binder

informs that the output address is the print sheet document 5-10-1. The document processor 5-9-1 converts an image document 5-8-1 constituting an input document into the print sheet document 5-10-1, thereby  
5 outputting a sheet.

Then the binder 5-4-1 generates a document 5-5-2 constituting an even smaller work unit and assigns the process thereto. As the finishing is designated on itself, it so works as to invalidate the finishing  
10 designation on the document. The binder 5-4-1 informs the document 5-5-2 of the print sheet document 5-10 constituting the already generated output document.

The document 5-5-2 processes the setting on itself, and assigns other processes to a document  
15 processor (image → sheet) 5-9-2 constituting an even smaller work unit. It also informs that the output address is the print sheet document 5-10. The document processor 5-9-2 converts an image document 5-8-2 constituting an input document into the print sheet  
20 document 5-10 thereby outputting a sheet.

Then the print job 5-3 processes the setting on itself, also generates a binder 5-4-2 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-2, upon detecting the setting of a  
25 finishing on itself (binder), generates a print sheet document 5-10-2 constituting an output document. It also processes the setting on itself, also generates a

document 5-5-3 constituting an even smaller work unit and assigns thereto other processes. In this operation, since the finishing is designated on the binder, the binder so functions as to invalidate the designation of finishing on the document. Also the binder informs the document 5-5-3 of the generated print sheet document 5-10.

The document 5-5-3 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-3 constituting an even smaller work unit. It also informs that the output address is the print sheet document 5-10. The document processor 5-9-3 converts an image document 5-8-3 constituting an input document into the print sheet document 5-10 thereby outputting a sheet.

Then the binder 5-4-2 generates a document 5-5-4 constituting an even smaller work unit and assigns the processes thereto. As the finishing is designated on the binder, the binder so functions as to invalidate the finishing designation on the document. Also the print sheet document 5-10-2 constituting the already generated output document is informed to the document 5-5-4.

The document 5-5-4 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-4 constituting an even smaller work unit. It also informs that the output



address is the print sheet document 5-10. The document processor 5-9-4 converts an image document 5-8-4 constituting an input document into the print sheet document 5-10 thereby outputting a sheet.

5           It is thus rendered possible to realize an operation of finishing in the unit of a binder by correlating the documents included in each binder to an output document and finishing such output document.

10           Figs. 31A and 31B show an example of the execution process in case a finishing is set on the document. In the present example, the finishing is set on the documents of a binder but not set on those of the other binder (cf. Fig. 31A).

15           As shown in Fig. 31B, the print job 5-3 processes the setting on itself, then generates a binder 5-4-1 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-1 processes the setting on itself, then generates a document 5-5-1 constituting an even smaller work unit and assigns the processes thereto.

20           The document 5-5-1 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-1 constituting an even smaller work unit. In this operation,  
25           as the output address is not designated from the upper ranked binder, the document 5-5-1 generates a print sheet document 5-10-1 as the output address regardless

of the presence or absence of the designation of the finishing, and informs the document processor 5-9-1 of such output address. The document processor 5-9-1 converts an image document 5-8-1 constituting an input document into the print sheet document 5-10-1, thereby outputting a sheet. In this operation, since the finishing is designated for the document 5-5-1, there is executed finishing on the print sheet document 5-10-1 constituting the output document.

10           Then the binder 5-4-1 processes the setting on itself, also generates a document 5-5-2 constituting an smaller work unit and assigns the processes thereto. The document 5-5-2 processes the setting on itself, and assigns other processes to a document processor (image  
15   → sheet) 5-9-2 constituting an even smaller work unit. As the output address is not designated from the upper ranked binder, the document 5-5-2 generates a print sheet document 5-10-2 as the output address regardless of the presence or absence of the designation of  
20 finishing, and informs the document processor 5-9-2 of such output address. The document processor 5-9-2 converts an image document 5-8-2 constituting an input document into the print sheet document 5-10-2, thereby outputting a sheet. In this operation, as the  
25 finishing is not designated on the document 5-5-2, the finishing is executed on the print sheet document 5-10-2 constituting the output document.

Then the print job 5-3 processes the setting on itself, also generates a binder 5-4-2 constituting a smaller work unit and assigns other processes thereto. The binder 5-4-2 processes the setting on itself, also  
5 generates a document 5-5-3 constituting an even smaller work unit and assigns other processes thereto.

The document 5-5-3 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-3 constituting an even  
10 smaller work unit. In this operation, since the output address is not designated from the upper ranked binder, the document 5-5-3 generates a print sheet document 5-10-3 as the output address regardless of the presence or absence of the designation of finishing, and informs  
15 the document processor 5-9-3 of such output address. The document processor 5-9-3 converts a image document 5-8-3 constituting an input document into the print sheet document 5-10-3, thereby outputting a sheet.

Then the binder 5-4-2 processes the setting on itself, also generates a document 5-5-4 constituting an  
20 even smaller work unit and assigns the processes thereto. The document 5-5-4 processes the setting on itself, and assigns other processes to a document processor (image → sheet) 5-9-4 constituting an even  
25 smaller work unit. As the finishing is not designated from the upper ranked binder, the document 5-5-4 generates a print sheet document 5-10-4 as the output

address regardless of the presence or absence of the designation of finishing, and informs the document processor 5-9-4 of such output address. The document processor 5-9-4 converts an image document 5-8-4  
5 constituting an input document into the print sheet document 5-10-4 thereby outputting a sheet.

It is thus rendered possible to realize an operation of finishing in the unit of a document by correlating the documents to an output document and  
10 finishing such output document.

The present embodiment not only provides the effects similar to those of the first embodiment but also enables, through various combinations of the setting and the process, detailed setting on the  
15 designation of finishing, such as stapled sorting, shift sorting, rotated sorting etc. in outputting plural documents in a job.

The objects of the present invention can naturally be attained also by supplying an information processing system with a memory medium storing program  
20 codes of a software realizing the functions of the aforementioned embodiments and by reading and executing the program codes stored in the memory medium by a computer (or a CPU or an MPU) of such system.

25 In such case, the program codes themselves read from the memory medium realize the novel functions of the present invention, and the memory medium storing

such program codes constitutes the present invention.

The memory medium supplying the program codes can be, for example, a floppy disk, a hard disk, an optical disk, a magnetooptical disk, a CD-ROM, a CD-R,  
5 a magnetic tape, a non-volatile memory card or a ROM.

Furthermore, the present invention naturally includes not only a case where the functions of the aforementioned embodiments are realized by the computer by executing the read program codes, but also a case  
10 where an operating system (OS) or the like functioning on the computer executes all the processes or a part thereof thereby realizing the functions of the aforementioned embodiments.

Furthermore, the present invention naturally  
15 includes a case where the program codes read from the memory medium are once stored in a memory provided in a function expansion board inserted into the computer or a function expansion unit connected thereto and a CPU or the like provided in such function expansion board  
20 or function expansion unit executes all the processes or a part thereof according to the instruction of such program codes, thereby realizing the functions of the aforementioned embodiments.

As explained in the foregoing, the present  
25 invention enables, with little labor and time, setting of the order of output in case of outputting plural documents in a single job or detailed setting on the

